

(No Model.)

2 Sheets—Sheet 1.

J. S. GRIFFITH.
LOW WATER SAFETY ATTACHMENT.

No. 341,905.

Patented May 18, 1886.

Fig. 1.

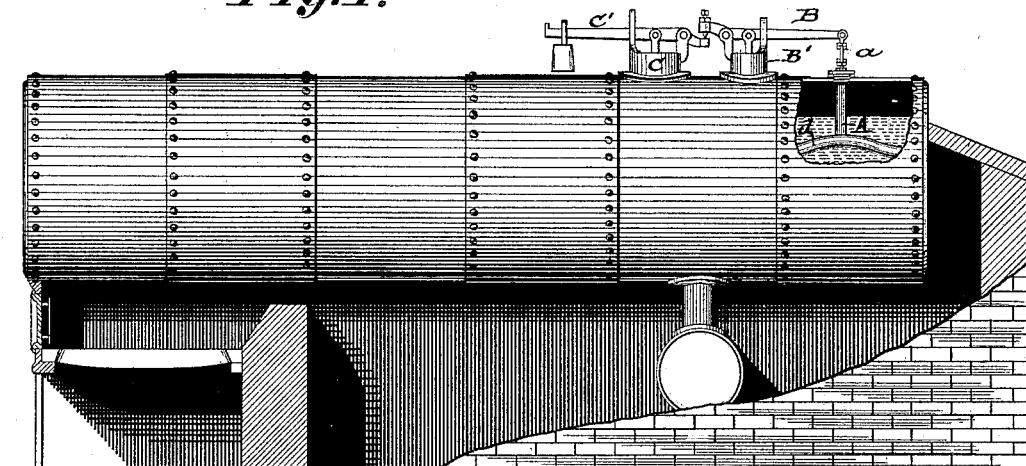
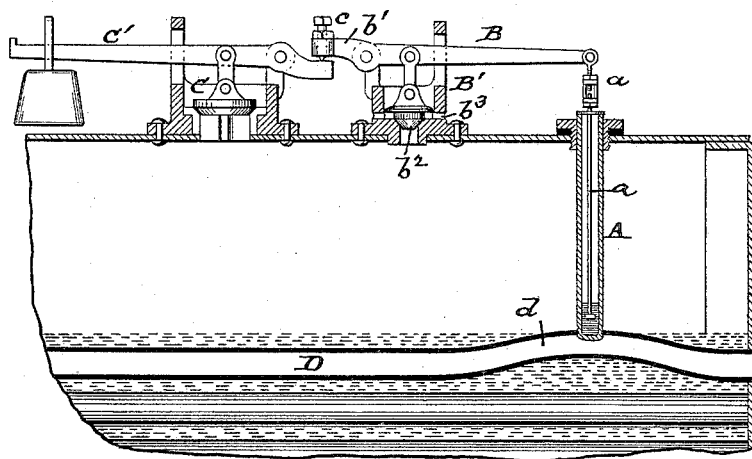


Fig. 2.



Attest:

Inventor:

Geo F Dexter

James S. Griffith
per

a. Campbell.

Robert Burns
attorney.

(No Model.)

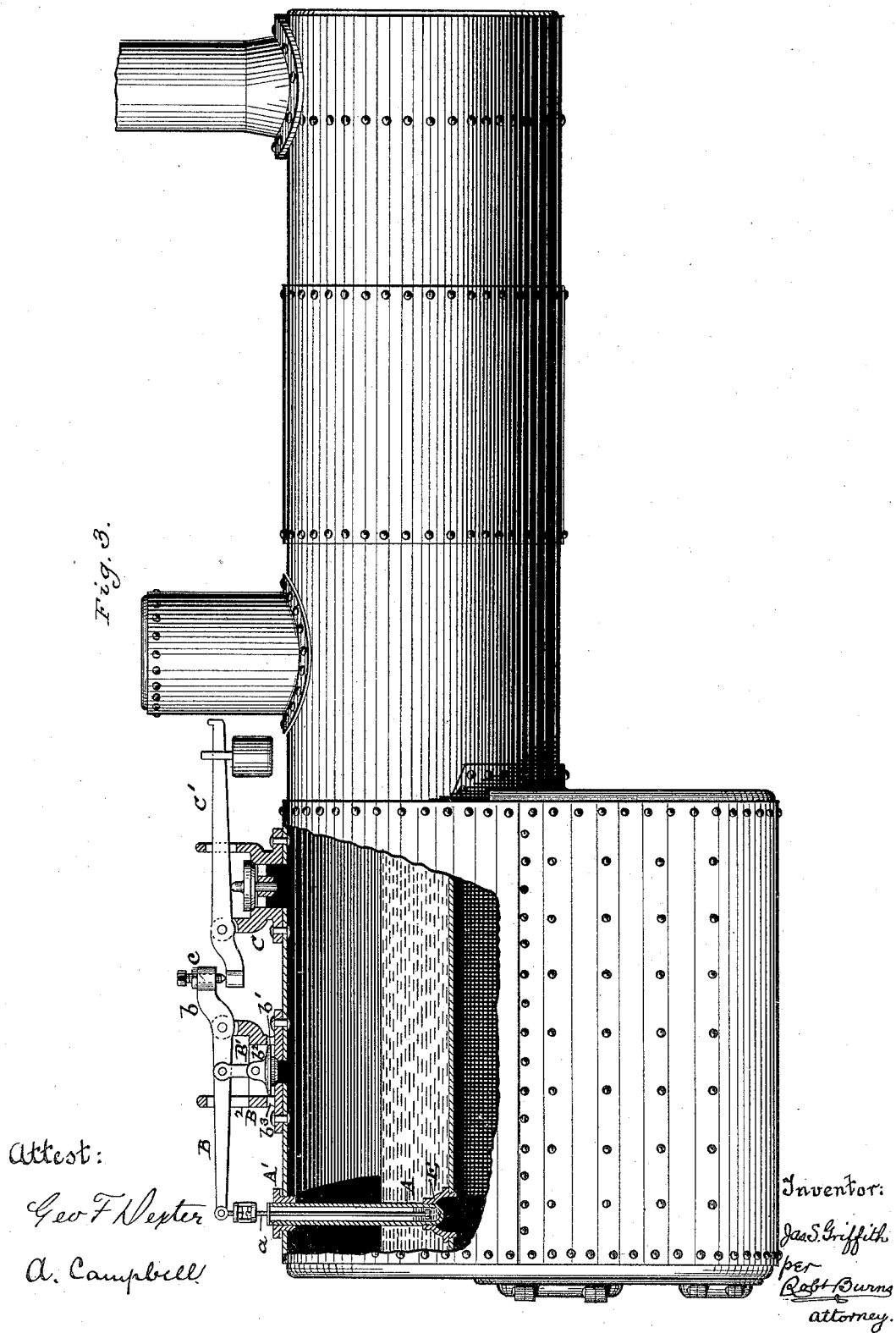
2 Sheets—Sheet 2.

J. S. GRIFFITH.
LOW WATER SAFETY ATTACHMENT.

No. 341,905.

Patented May 18, 1886.

Fig. 3.



Attest:

Geo F Nepter

A. Campbell

Inventor:

Jas S Griffith

per
Robt Burns
attorney.

UNITED STATES PATENT OFFICE.

JAMES S. GRIFFITH, OF SPRINGFIELD, ILLINOIS, ASSIGNOR OF THREE-
FOURTHS TO ROBERT G. SPEER, OF ST. LOUIS, MISSOURI.

LOW-WATER SAFETY ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 341,905, dated May 18, 1886.

Application filed March 6, 1884. Serial No. 123,245. (No model.)

To all whom it may concern:

Be it known that I, JAMES S. GRIFFITH, a citizen of the United States, and a resident of Springfield, in the county of Sangamon and State of Illinois, have invented certain new and useful Improvements in Low-Water Safety Attachments for Steam-Boilers, of which the following is a specification.

This invention relates to that class of low-water safety attachments to steam-boilers in which dependence is placed upon the fusion of a body of fusible metal to relieve the boiler of pressure; and my improvement has for its objects, first, to cause the boiler to be relieved of pressure when the danger-line is reached and before the crown-sheet or upper flues or tubes of the boiler are left uncovered, and thus avoid the burning out of said crown sheets or flues, as has been the case usually with the "fusible plugs" heretofore employed; second, to permit of the ready closing of the blow-off mechanism after the boiler has been relieved of pressure; and, third, to provide a system of automatically operating compound valves for relieving the boiler of pressure in a very ready and efficient manner. I attain such objects by the construction and arrangement of parts, illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section of a horizontal flue-boiler to which my improvement is applied. Fig. 2 is a detail longitudinal section of the same; and Fig. 3 is an elevation, partly in section, illustrating my improvements applied to a boiler of the locomotive type.

Similar letters of reference indicate like parts in the several views.

As illustrated in the drawings, my improvement consists of a containing-tube, A, the lower end of which is closed and passes through the crown-sheet or one of the upper rows of flues or tubes of the boiler, so as to be exposed directly to the fire. Its upper end passes through the top of the boiler, preferably through a stuffing-box, A', as shown.

Within the containing-tube A is placed a body of fusible metal, preferably block-tin, in which is embedded in proper position the lower enlarged end of the valve-holding stem or rod a. This stem or rod extends up through a

loose washer at the top of the containing-tube A, and is connected to the end of the lever B of the small relief-valve B', the arrangement being such that upon the water in the boiler falling below a given danger-line, it will leave the lower end of the containing-tube A unprotected or uncovered by water, allowing the fusible metal to melt and release the valve-holding rod a and permit the valve B' to open, so as to assist in relieving the boiler of pressure. This relieving of the boiler from pressure is further assisted by connecting the short arm b of the valve-lever B to the short arm of the lever C' of the large relief or safety valve C, so as to cause the same to open.

In order to enable the safety apparatus, as above described, to act and relieve the boiler of pressure, when such danger-line is reached, which will usually be before the upper surface of the top row of tubes, flue, or crown-sheet are exposed in an uncovered condition to the action of the fire, I form a part of the boiler that is in contact with the fire or heated products of combustion, and adjacent to and under the water-line of the boiler, with an upwardly-projecting hollow portion, to the crown of which is attached the lower closed end of the fusible-metal-containing tube A. With this construction, as the water in the boiler falls toward the danger-line, the lower end of the containing-tube A will be uncovered, so as to permit of the fusible metal fusing to release the relieving apparatus before the water has fallen sufficiently to uncover the tube or portion of the boiler to which attachment is made. In cases where my improvement is to be applied to a tubular boiler, I form such upwardly-projecting hollow portion by forming one of the upper row of tubes, D, with a raised curved portion, d, into which is screwed or otherwise secured the lower end of the fusible-metal-containing tube A, as indicated in Figs. 1 and 2.

In cases where my improvement is to be applied to a flue-boiler in which it is impracticable to form a bend or curve, as above set forth, in one of the flues owing to its large diameter, or where the application is made to the crown-sheet of an internally-fired boiler, as illustrated in Fig. 3, I form the upwardly-projecting hollow portion, heretofore described, by means

of a dome, E, that is screwed into or otherwise secured to one of said flues or to the crown-sheet of the fire-box, as illustrated in Fig. 3.

In most cases the valve C can be the ordinary safety-valve of the boiler, and can be of any of the usual forms of the same, either weighted, as shown, or the usual spring pop-valve, as found most desirable or convenient.

In order to render the main valve C capable of operation independent of the valve B', so as to act independently of the same for ordinary safety-valve purposes, I make connection between the shorter arms of the valve-levers B C' by means of a compensating set-screw, c, which is capable of adjustment so as to bring the two valves in unison to a seat.

It is preferable to form the smaller valve B' with a lower valve portion, b', and a disk portion, b², which acts as a piston within the cylindrical extension B² of the valve-casing, the purpose being to impart a limited positive motion to said valve and its lever, and insure an opening of the main or safety valve c.

b² are small openings in the valve-casing to permit of the escape of the steam passing up through the opening of the valve B'. In use these openings may be dispensed with and the upper part of the valve-casing formed with grooves or corrugations, so as to furnish escape-passages for the steam after the valve has raised to a certain height.

With my improvement, after the boiler has relieved itself of pressure, the valve B' can be properly loaded or secured and steam again raised, the fusible metal again setting so as to hold the valve in place ready for automatic action when again required.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a low-water safety apparatus for steam-boilers, the combination of the following elements:

an upper tube-flue or crown-sheet having an upwardly-projecting hollow portion, essentially as herein described, with the fusible metal-containing tube A, of a safety relieving device, substantially as and for the purpose set forth.

2. In a low-water safety apparatus for steam-boilers, essentially as herein described, one of the flues or crown-sheets of a boiler having an upwardly-projecting hollow portion formed by a bonnet, E, and a tube, A, attached thereto and containing a body of fusible metal, in combination with the valve-holding rod a and valve B', essentially as herein described, and for the purpose set forth.

3. In a low-water safety apparatus for steam-boilers, essentially as herein described, the combination of the containing-tube A for the fusible metal, valve-holding rod a, valves B' and C, the parts being arranged essentially as herein described, and for the purpose set forth.

4. In a low-water safety apparatus for steam-boilers, essentially as herein described, the combination of valves B' C and their levers B C' with the compensating set-screw c, essentially as herein described, and for the purpose set forth.

5. In a low-water safety apparatus for steam-boilers, essentially as herein described, the valve B', formed with a valve portion, b', and a disk or piston portion, b², in combination with the valve C, connections b C', tube A, containing a body of fusible metal, rod a, and lever B, essentially as herein described, and for the purpose set forth.

In testimony whereof witness my hand this 19th day of February, 1884, at the city of Chicago, State of Illinois.

JAMES S. GRIFFITH.

In presence of—

ROBERT BURNS,
CHAS. F. SHOEMAKER.